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A New Fresh-water Triclad from Japan.

With 2 Text-figures

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In the early summer of 1943 numerous specimens of a mature fresh-water planarian which has long been regarded as referrable to *Dugesia gonocephala* (Dugès, 1830), the most common species in Japan, were found to be intermingled with a number of asexual individuals reproduced by fission in the vicinity of the Mitsui Institute of Marine Biology at Izu, Shizuoka Prefecture. A close examination proves that the specimen in question differs from the above named form in having an adenodactyl or muscular-gland organ attached to the copulatory apparatus. So far as I can learn, there are spread over the world about 35 species of *Dugesia*, of which the three species, *bohmigi* (Weiss, 1910), *hoernesi* (Weiss, 1910) and *cretica* (Meixner, 1928; Kenk, 1930) are provided with the said organ of the *Dendrocoelum lacteum*-type (Kenk, 1930). On the contrary, the present form is marked with an adenodactyl of the *Polycelis tenuis*-type. Consequently I am inclined to deal with this as a species undescribed hitherto.

Dugesia izuensis sp. nov.

The body, when extended, is slender and measures 25 mm long by about 2–3 mm broad. The head in the living state is as usual of a triangular shape with a rather pointed tip and a prominent auricular projection on either side. Behind the head, the body is somewhat narrower, and has the same width posteriorly to a level behind the pharynx, where it tapers gradually to a bluntly pointed posterior extremity. The color of the body is brownish-yellow, -orange or -green, owing to the contents of the intestinal branches. The body margin is colorless. There often may be seen an indistinct darker streak along the median line between the mouth and the genital pore.

The two eyes lie close to each other at a level slightly in front of the line connecting the bases of the two auricles, each being situated at the medial margin of a round colorless area. The distance between them is less than that between either of the eyes and the lateral head-margin of the same side. The auricular sense organs are well observable in life as a very distinct, slenderly reniform, non-pigmented area on each cephalic projection. The mouth opening, situated at the posterior limit of the third quarter of the body, leads into the pharyngeal sheath, which contains the cylindrical pharynx. The base of the pharynx occupies a position at about the center of the body, measuring about one eighth the body length.

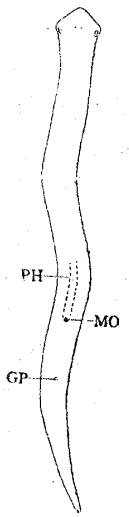

Fig. 1. *Dugesia izuensis* sp. nov. × 2.3

The arrangement of the muscle fibers in the pharynx is of the type characteristic of the family *Planariidae;* the longitudinal circular fibers of the inner muscular zone form distinct layers. The external muscular zone consists of an outer layer of longitudinal muscles underlying the surface epithelium of the pharynx and an inner layer of circular fibers. The intestine is quite of the Triclad-type. The anterior trunk reaches up to the level of the eyes and bears on each side 10–15 lateral branches which are ramified to a considerable extent. The posterior trunks are provided with more than 20 subdivided branches.

Numerous testes are arranged in the dorsal parenchyma lateral to the main intestinal trunks between the lateral branches, and extend from shortly in front of the ovaries to nearly the posterior end of the body. The vasa deferentia run in the prepharyngeal region along the upper side of the main nerve trunk on each side, medial to the oviduct. At the level of the mouth they expand to form large sinuous tubes, or the false seminal vesicles. Near the penis they become narrower and abruptly turn anteromedially to enter the penis bulb, and finally to open into the seminal vasicle at its anterior aspect.

The penis consists as usual of two parts, viz., the free, conical papilla which is a massive intromittent part lying horizontally in the male atrium, and the bulbous basal part which is strongly muscular in nature and indistinctly marked off from the surrounding parenchyma. The penis bulb encloses the moderately large seminal vesicle of a compressed ovoid shape, which passes at the center of the posterior surface into the narrow ejaculatory duct, opening into the male atrium at the tip of the penis. Almost in the midway between its proximal and

distal ends the ejaculatory duct receives a large quantity of the eosinophilous secretion of the penis-glands which are distributed in the parenchyma around the penis bulb.

The bursa copulatrix is a large sac-like organ occupying a position between the pharyngeal chamber and penis, and extending through the entire dorso-ventral diameter of the parenchyma. Its wall is an epithelium made up of large columnar cells of a glandular nature, resting on a delicate basement membrane, beneath which are layers of fine circular and longitudinal fibers. From the postero-superior end of the copulatory bursa arises the bursa duct which runs backwards, passing dorsally to the left of the penis, and then dips below to open into the common atrium. The bursa duct is internally lined with an epithlium of cylindrical cells lying on a fine basement membrane. Just external to this are formed the internal thin longitudinal and the outer thick circular muscle layer. In the parenchyma around this muscular coating there exist a large number of unicellular glands which secrete fine eosinophilous granules into the bursa duct.

The two ovaries, located immediately behind the head, show no anatomical peculiarities. Vitellaria or yolk glands are represented by cellular cords with the cells arranged in one or more rows; they are very extensively distributed posteriorly from the region of the ovaries and in the interstices between the gut diverticula, and stand at many points in connection with the oviducts. The two oviducts open separately from posteriad into the bursa stalk at the place where the stalk leads into the common atrium, Shell glands open into the bulsa stalk in an

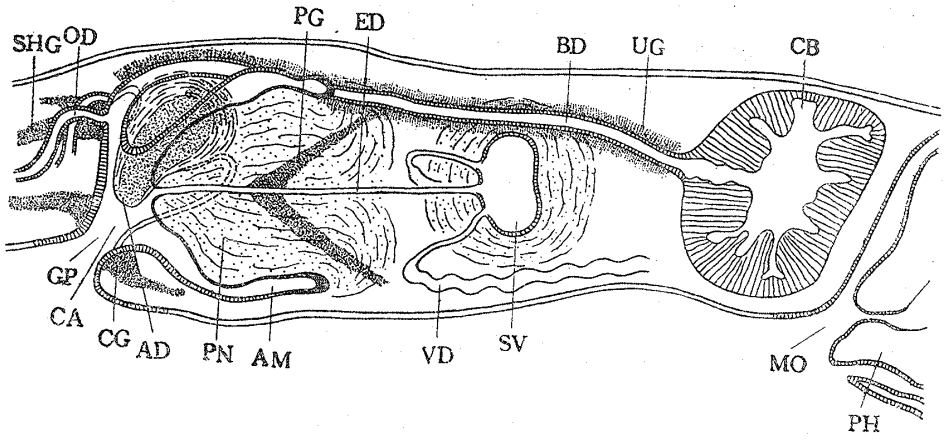

Fig. 2. *Dugesia izuensis* sp. nov., diagram of the copulatory organs in longitudinal section. × 50

AD adenodactyl; AM male atrium; BD duct of copulatory bursa; CA common atrium; CB copulatory bursa; OG cement gland; ED ejaculatory duct; GP genital pore; MO mouth; OD oviduct; PG penis gland; PH pharynx; PN penis; SHG shell gland; SV seminal vesicle; UG unicellular gland; VD vas deferens.

annular area situated below the openings of the oviducts, devoid of any trace of connecting with them.

The genital pore lies at the hind limit of the anterior third of the postpharyngeal region. It leads to the moderately large common atrium, into which the bursa stalk makes its way from the dorsal side. The short tubular connection between the genital pore and common atrium receives the outlets of numerous cement glands, the secretion of which is rather coarsely granular and stains an intense red by treatment with eosine.

The male atrium, enclosing the penis papilla, is separated from the common atrium by a projecting diaphragm. One peculiarity lies in the presence of an adenodactyl or muscular gland organ which is of the so-called *Polycelis tenuis*-type, as demonstrated in such *Polycelis* species as *tenuis* Ijima, *cornuta* Johnston, *tôthi* Méhely and *linkoi* Sabussow. This structure projects postero-ventrally into the penis papilla. It is conical in shape, far smaller than the penis papilla and covered with a flat epithelium, which becomes thinner and thinner towards the tip of the papilla, and beneath which occurs a thick layer of muscle fibers, chiefly circular in nature. The central part of this adenodactyl is filled with gland cells secreting faintly cyanophilous fine granules, but destitute of any trace of secretory duct, notwithstanding the presence in *Planaria torva* of a distinct canal lined with an epithelium. Therefore, in the present species, the secretion may be poured into the genital atrium through the thin epithelium of the distal part of the papilla. The gland cells are not only distributed inside the said organ but also in the parenchyma of its muscular coating.

In spite of a close resemblance in its external feature to *Dugesia gonocephala*, the present planarian is clearly distinguished from this and the other known species of *Dugesia* by the possession of the adenodactyl of the *Polycelis tenuis*-type.

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